

AMENDMENTS TO THE CLAIMS

Claims 1-21 (Canceled)

22. (Previously presented) A process meter for measuring at least one physical process variable of a medium stored in a process container or flowing in a process line, comprising:

a transducer including a sensor arrangement providing measurement signals (s_1, s_2), said sensor arrangement having: at least a first sensor providing at least a first measurement signal (s_1) in response to the physical process variable being measured, particularly to changes in the process variable, and at least a first temperature sensor mounted in said transducer for locally sensing a first temperature, T_1 , in the transducer, and by means of said at least one temperature sensor, at least a first temperature measurement signal (Θ_1) representing the first temperature, T_1 , in said transducer; and

meter electronics which, using at least said first measurement signal (s_1) and a first correction value (K_1) for the at least first measurement signal (s_1), derive at least one measured value (X) currently representing the physical variable, wherein:

during operation, said meter electronics determine the first correction value (K_1) from a temporal variation of the at least first temperature measurement signal (Θ_1) by also taking into account temperature values sensed in the past by means of said first temperature sensor.

23. (Previously presented) The process meter as defined in claim 22, wherein:

during operation, said meter electronics respond to a change in the first temperature measurement signal (Θ_1), corresponding to a change in the first temperature, with a change in the first correction value (K_1) after a time delay.

24. (Currently amended) The process meter as defined in claim 22, wherein:

said sensor arrangement further has at least a second temperature sensor mounted in said transducer, particularly in spaced relationship from said first

temperature sensor, for locally sensing a second ~~second~~ temperature, T_2 , in said transducer, and wherein:

by means of said second temperature sensor, said sensor arrangement provides at least a second temperature measurement signal (Θ_2), representing the second temperature, T_2 .

25. (Previously presented) The process meter defined in claim 24, wherein:
said meter electronics determine the first correction value (K_1) by also using the second temperature measurement signal (Θ_2).

26. (Previously presented) The process meter as defined in claim 24, wherein:

said meter electronics determine a second correction value (K_2) from a temporal variation of at least the second temperature measurement signal (Θ_2); and
said meter electronics derive the measured value (X) by also using the second correction value (K_2).

27. (Previously presented) The process meter as defined in claim 22, wherein:

said meter electronics comprise a filter stage (FS) for deriving the at least first correction value (K_1), with the first temperature measurement signal (Θ_1) being applied to a first signal input of said filter stage (FS).

28. (Previously presented) The process meter as defined in claim 27, wherein:

said filter stage (FS) comprises a first A/D converter (AD_1) for converting the first temperature measurement signal (Θ_1) to a first digital signal (Θ_{1D}).

29. (Previously presented) The process meter as claimed in claim 28, wherein:

said filter stage comprises a first digital signal filter (SF_{1D}) for the first digital signal (Θ_{1D}).

30. (Previously presented) The process meter as defined in claim 29, wherein:

said first digital signal filter (SF_{1D}) is a recursive filter.

31. (Previously presented) The process meter as defined in claim 29, wherein:

said first digital signal filter is a nonrecursive filter.

32. (Currently amended) The process meter as defined in claim ~~[[26]]~~ 27, wherein:

said filter stage (FS) also serves to derive the second correction value (K_2), in which case the second temperature measurement signal (Θ_2) is applied to a second signal input of said filter stage (FS); and

said filter stage (FS) comprises a second A/D converter (AD_2) for converting the second temperature measurement signal (Θ_2) to a second digital signal (Θ_{2D}).

33. (Previously presented) The process meter as defined in claim 27, wherein:

said filter stage comprises a second digital signal filter for the second digital signal (Θ_{2D}).

34. (Previously presented) The process meter as defined in claim 22, wherein:

said transducer comprises at least one flow tube for conducting the flowing medium.

35. (Previously presented) The process meter as defined in claim 34, wherein:

at least one of said two temperature sensors is mounted on said flow tube or in the vicinity thereof.

36. (Previously presented) The process meter as defined in claim 34, wherein:

said transducer comprises a transducer case enclosing said flow tube.

37. (Previously presented) The process meter as defined in claim 36, wherein:

at least one of said temperature sensors is fixed to said transducer case or positioned at least in the vicinity thereof.

38. (Previously presented) The process meter as defined in claim 34, wherein:

said transducer further comprises a electrodynamic electromagnetic vibration exciter electrically connected to said meter electronics for driving said flow tube; and

said meter electronics provide at least one excitation signal (i_{exc}) for controlling said vibration exciter, so that in operation, said flow tube is vibrated at least intermittently.

39. (Previously presented) The process meter as defined in claim 38, wherein:

said first sensor responds to vibrations of said flow tube, particularly to inlet-side or outlet-side vibrations; and

the measurement signal (s_1) provided by said first sensor represents mechanical vibrations of said vibrating flow tube which are influenced by the process medium.

40. (Previously presented) The process meter as defined in claim 38, wherein:

said transducer comprises a supporting element fixed to said flow tube, particularly a supporting element mounted in said transducer case so as to be capable of vibratory motion, for supporting said vibration exciter and at least said first sensor.

41. (Previously presented) The process meter as defined in claim 40, wherein:

at least said first temperature sensor is fixed to said supporting element or positioned at least in the vicinity thereof.

42. (Previously presented) The process meter as defined in claim 22, wherein:

said sensor arrangement comprises at least a second sensor for providing at least a second measurement signal (s_2) in response to the physical process variable; and

said meter electronics derive the measured value by also using the second measurement signal.

43. (Previously presented) The process meter as defined in claim 22, wherein:

said meter is one of: a mass flow rate meter, a density meter, a viscosity meter, a pressure meter, or the like.

44. (New) The process meter as defined in claim 29, wherein: said first digital signal filter computing said first digital signal based on the numerical algorithm defined by:

$$\theta'_{1,t} = \sum_{k=0}^M a_k \cdot \theta'_{1,t-k\Delta t} - \sum_{k=1}^N b_k \cdot \theta'_{1,t-k\Delta t},$$

wherein $\theta'_{1,t}$ is an instantaneous value of said value first digital signal, $\theta'_{1,t-\Delta t}$ is a previous value of said value first digital signal, a_k is an ensemble of M nonzero coefficients of the numerical algorithm with $M \geq 2$, b_k is an ensemble of N coefficients of the numerical algorithm with $N \geq 0$.

45. (New) A method for compensating errors thermally induced in a measurement signal due to unsteady temperature distribution within a transducer of a process meter for measuring at least one physical process variable of a medium stored in a process container or flowing in a process line, said transducer including at least a first sensor for providing at least a first measurement signal in response to the physical process variable to be measured, and at least a first temperature sensor

mounted in said transducer for locally sensing a first temperature in the transducer, said method comprising steps of:

generating, by means of at least said first sensor, said first measurement signal, and generating, by means of at least said first temperature sensor, at least a first temperature measurement signal representing said first temperature in the transducer;

determining from a temporal variation of said first temperature measurement signal a first correction value for at least the first measurement signal; and using said first measurement signal and said first correction value to derive at least one measured value currently representing the physical variable;

wherein the step of determining the first correction value includes a step of taking into account temperature values sensed in the past by means of said first temperature sensor.

46. (New) The method as claimed in claim 45, wherein the transducer further includes at least a second temperature sensor mounted in said transducer for locally sensing a second temperature in the transducer, said method further comprising a step of generating, by means of at least said second temperature sensor, at least a second temperature measurement signal representing said second temperature in the transducer.

47. (New) The method as claimed in claim 45, further comprising the steps of:

determining from a temporal variation of said second temperature measurement signal a second correction value for at least the first measurement signal; and

using also said second correction value to derive at least one measured value currently representing the physical variable.

48. (New) The method as claim 45, wherein the step of determining the first correction value includes a step of taking into account temperature values sensed in the past by means of said second temperature sensor.

49. (New) The method as claimed in claim 45, wherein the transducer further includes at least a second sensor for providing at least a second measurement signal in response to the physical process variable to be measured, said method further comprising a step of generating, by means of at least said second sensor, said second measurement signal.

50. (New) The method as claimed in claim 45, further comprising step of using also said second measurement signal to derive said at least one measured value currently representing the physical variable.

51. (New) The method as claimed in claim 45, further comprising a step of using a digital filter for generating said first correction value, said digital filter bases on the numerical algorithm defined by:

$$\theta'_{1,t} = \sum_{k=0}^M a_k \cdot \theta_{1,t-k\Delta t} - \sum_{k=1}^N b_k \cdot \theta'_{1,t-k\Delta t} ,$$

wherein $\theta'_{1,t}$ is a digital value currently derived from said first temperature signal, $\theta_{1,t-\Delta t}$ is a digital value derived from said first temperature signal previously, a_k is an ensemble of M nonzero coefficients of the numerical algorithm with $M \geq 2$, b_k is an ensemble of N coefficients of the numerical algorithm with $N \geq 0$.